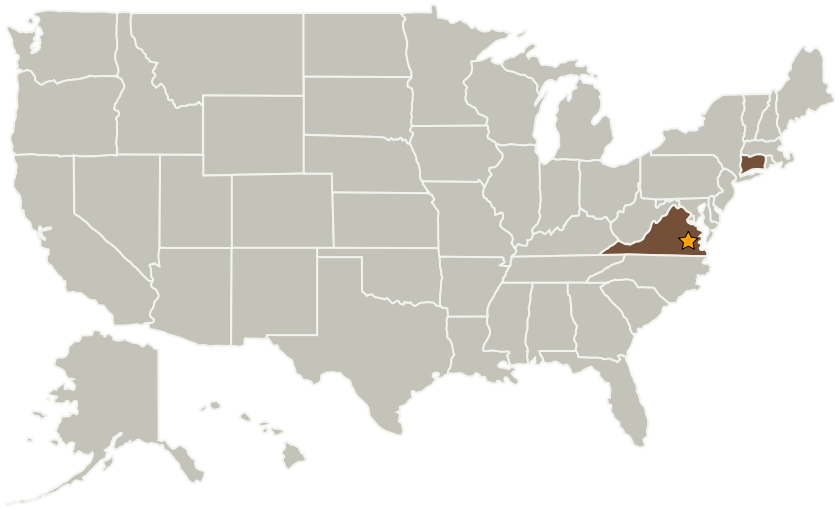
# Characterizing and Manufacturing Multifunctional Radiation Shielding Materials, Phase I

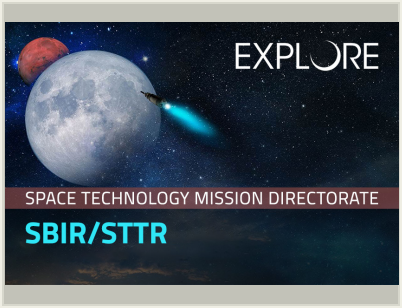
Completed Technology Project (2006 - 2006)

## Project Introduction

This project addresses two vital problems for long-term space travel activities: radiation shielding and hydrogen storage for power and propulsion. While both problems have been studied for many years, there is currently no satisfactory technology for providing adequate non-parasitic shielding. Even in low-Earth orbit, astronauts must be closely monitored for radiation exposure, and some missions simply cannot be performed due to the current inability to adequately shield astronauts (e.g. Mars or surface Lunar bases). The overall objective of the proposed project is to implement a new manufacturing technique for the fabrication of monolithic sorbent modules for hydrogen storage and radiation shielding. We will evaluate the resulting process for quality control in terms of shape and size consistency. We will work with Boeing on component and system characterization of elemental composition, mechanical strength, and other functional properties. AFR will explore, in partnership with ATMI, an alternate commercialization strategy, described in the proposal. During the process and product assessment, we will coordinate possible commercial ventures with Boeing and ATMI. Previously, a prototype system was operated at two accelerators, demonstrating both operational effectiveness and the ability to significantly reduce the energy of high energy particles (48 GeV Ti ions and various energy protons).

## Primary U.S. Work Locations and Key Partners



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## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Langley Research Center (LaRC)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

**Small Business Innovation Research/Small Business Tech Transfer**

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| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| ★Langley Research Center(LaRC) | Lead Organization | NASA Center | Hampton, Virginia |
| Advanced Fuel Research, Inc. | Supporting Organization | Industry | East Hartford, Connecticut |

| Primary U.S. Work Locations | |
|---|---|
| Connecticut | Virginia |

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.5 Radiation
    - TX06.5.3 Protection Systems